**Internship Training**

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BYJU'S

# A STUDY IMPACT OF COVID-19 IN CANCER PATIENTS

By

SAGAR KUMAR JHA

ENROLL NO- PG/20/061

Under the guidance of DR. NITISH DOGRA

P0ST GRADUATE DIPLOMA IN Hospital & Health Management
2020-22


International Institute of Health Management Research
New Delhi

# ACKNOWLEDGEMENT

On the very outset of this report, I would like to extend my sincere and obligation towards all the personages who have helped me in this endeavor. Without their active guidance, help, cooperative and encouragement, I would not made headway in the project.

I am inevitable indebted to Dr. Sutapa B Neogi for conscientious guidance and encouragement to accomplish this assignment.

I am extremely thankful and pay my gratitude to my faculty guide organization mentor **Dr. Nitish Dogra (**MBBS, MD, MPH IN JOHNS HOPKINS) his valuable guidance and support on completion of this project in its presently.

I extend my gratitude to international institute of Health Management Research, Delhi for giving this opportunity.

I also acknowledge with a deep sense of reverence, my gratitude towards my family and friends who has always supported me morally.

Any omission in this brief acknowledgement does not mean lack of gratitude.

Thanking You

Sagar Kumar Jha

The certificate is awarded to

**SAGAR KUMAR JHA**

In recognition of having successfully completed his Internship in the department of

Project Management

and has successfully completed his/her Project on

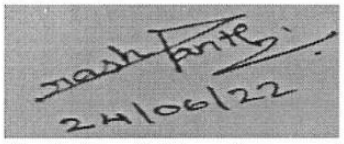
**Impact of Covid-19 on cancer patients**

**15st April to 30th June**

Organization- **BYJU'S**

He comes across as a committed, sincere & diligent person who hasa strong drive & zeal for learning.

We wish him all the best for future endeavors.



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**Zonal Head-Human Resources**

## Certificate of Approval

The following dissertation titled **"A study on the impact of Covid-19 on cancer patients",** " at **"BYJU'S** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of PGDM (Hospital & Health Management) for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

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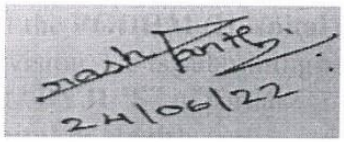
| Name | Signature |
| --- | --- |
| Dr. Dharmesh Lal | |
| Dr. B.S. Siju. | BSSijy |
| Dr. ROHINI | Rohini |

## Certificate from Dissertation Advisory Committee

This is to certify that **SAGAR KUMAR JHA,** a graduate student of the **PGDHM (Hospital & Health Management)** has worked under our guidance and supervision. He is submitting this dissertation titled "**Impact of Covid-19 on cancer patients.**" at "**BYJU'S**" in partial fulfillment of the requirements for the award of the **PGDHM (Hospital & Health Management).**

This dissertation has the requisite standard and to the best of our knowledge no part of it has beenreproduced from any other dissertation, monograph, report or book.



DR. NITISH DOGRA

Institute Mentor Name,
Designation, ASSOC. PROF.

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27-06-2022

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Designation,

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| Name of Student (in block letter) | Dr./Mr./Ms.: Sagar Kumar Jha. | | |
| Enrollment/Roll No. | PGI/20/061 | Batch Year | 2020-22 |
| Course Specialization (Choose one) | Hospital Management | Health Management ✓ | Healthcare IT |
| Name of Guide/Supervisor | Dr./ Prof.: Dr. Nitish Dogra. | | |
| Title of the Dissertation/Summer Assignment | Impact of Covid-19 on Cancer Patients. | | |
| Plagiarism detect software used | "TURNITIN" | | |
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Signature: ND Dogra

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Student

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Signature: Sagarkumarjha.

21/6/2022

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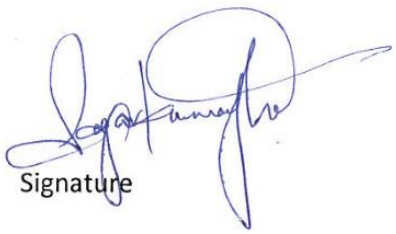
(Seal)

**INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH, NEW DELHI**

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **IMPACT OF COVID-19 IN CANCER PATIENTS** and submitted by **Sagar Kumar Jha** Enrollment No. **PG/20/061** under the supervision of **Dr.Nitish Dogra** for award of PGDM (Hospital & Health Management) of the Institute carried out during the period from **Apr '01 to June '30** embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.



Signature

**FEEDBACK FORM**

**Name of the Student:** Sagar Kumar Jha

**Name of the Organization in Which Dissertation Has Been Completed:** BYJU'S

**Area of Dissertation:** Secondary Review

**Attendance:** 100%

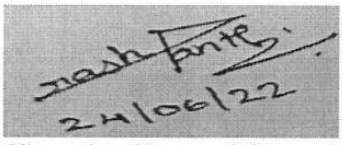
**Objectives achieved:** yes

**Deliverables:** Review Article

- **Strengths:** Enthusiasm, Trustworthiness, Creativity, Discipline, Patience, Respectfulness, Determination, AND Dedication.

**Suggestions for Improvement:** improving in public speaking

**Suggestions for Institute (course curriculum, industry interaction, placement, alumni):**




**Signature of the Officer-in-Charge/ Organization Mentor (Dissertation)**

Date: 24/06/2022
Place: Bangalore

Annexure F

# FEEDBACK FORM

**Name of the Student:** SAGAR KUMAR JHA

**Name of the Organisation in Which Dissertation Has Been Completed:** BYJU'S

**Area of Dissertation:** Impact of COVID-19 on cancer patient

**Attendance:** Good.

**Objectives achieved:** Yes

**Deliverables:** Review Article

**Strengths:** Methodical approach

**Suggestions for Improvement:** Initially unsatisfactory but improved after suggestions

**Suggestions for Institute (course curriculum, industry interaction, placement, alumni):**

- More interaction with mentee

**Signature of the Officer-in-Charge/ Organisation Mentor (Dissertation)**

**Date:** 23-06-2022
**Place:** NEW DELHI

DR. NITISH DOGRA

Annexure D

**TO WHOMSOEVER IT MAY CONCERN**

This is to certify that Sagar Kumar Jha student of PGDM (Hospital & Health Management) from International Institute of Health Management Research, New Delhi has undergone internship training at BYJU'S from 01/04/2022 to 15/06/2022.

The Candidate has successfully carried out the study designated to him during internship training and his/her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish him all success in all his/her future endeavors.

23/6/2022

Dr. Sumesh Kumar
Associate Dean, Academic and Student Affairs
IIHMR, New Delhi

Mentor

IIHMR, New Delhi

DR. NITISH DOGRA

23-06-2022

# Impact of Covid-19 on Cancer patients

Mr Sagar Kumar Jha

TABLE OF CONTENT

## ORGANISATION PROFILE

BYJU'S app was developed by Think and Learn pvt. The company was founded in 2011 by Byju Raveendran, Divya Gokulnath, and a group of students. Trade engineer Byju has been teaching math to students since 2006. Initially, the company focused on providing video-based online tutorials for the kindergarten to high school segment and competitive exams. In 2012, the company was included in the Deloitte Technology Fast 50 India and Deloitte Technology Fast 500 Asia Pacific ratings and has been a presence ever since. In August 2015, the company released Byju's: The Learning App. In 2017, we released the Byjus Math app and the Byjus Parent Connect app for kids. By 2018, there were 15 million users, of which 900,000 were paid users at that time. That same year, Byju's became the first edtech unicorn in India. As of 2019, 60% of BYJU students came from rural towns other than the subway. In January 2022, the company joined Simplilearn, Unacademy, up Grad and Vedanta and became one of the founding members of IAMAI's India EdTech Consortium.

Byju`s is an educational instruction app that runs on a freemium model. You will have free access to the content within 15 days of registration. Launched in August 2015, it provides educational content to grades 4-12 students. In 2019, an early learning program for grades 1 to 3 was launched. We also train students for exams in India such as IIT-JEE, NEET, CAT, IAS and international exams such as GRE and GMAT. Academic topics and concepts are explained in 12-20 minute digital animated videos through which students learn at their own pace. Byju's report has a total of 40 million users, 3 million paying subscribers annually, and an annual retention rate of approximately 85%. In 2019, the company announced that it would release the app in the regional languages of India. There were also plans to launch an international version of the app for English-speaking students in other countries. Also, for kindergarten children, Byju's has introduced a new program in the Early Learn app.

Byju's, India's most valued edtech startup, has partnered with NITI Aayog to provide free access to its tech-driven learning programmes for children from 112 "aspirational districts" of the country. As part of the partnership, a dedicated working group will be set up that will—among other things—actively monitor and evaluate implementation of the programmes, according to a statement released on Friday. The so-called aspirational districts are in the country's most developmentally challenged regions across sectors such as health and nutrition, education, agriculture and water resources, infrastructure, financial inclusion, and skill development or the Career Plus programme, students will be selected through a pre-designed test and provided teaching and content material, along with mentoring support and guidance. This initiative will combine classroom and online learning.

## INTRODUCTION

The Covid-19 cases 28,807,631 showed instances and 4,697,099 deaths, the coronavirus ailment 2019 (COVID-19) pandemic, because of the beta-coronavirus intense acute breathing syndrome coronavirus 2 (SARS-CoV-2), has unfold over the world. The date is September 19th, 2021. COVID-19 sufferers have poorer outcomes than the ones without an underlying cancer, but mortality prices variety broadly among studies, starting from 3.7 percentage to 61.five percentage. The severity of this illness can variety from asymptomatic to acute breathing misery syndrome (ARDS), which calls for instant scientific interest and may result in death.[1,2]

Supportive treatment and prevention measures are currently available to prevent further virus spread [3,4]. Despite the lack of a cure, many experiments are being carried out in order to find the most effective treatment.

When most cancers sufferers are uncovered to the virus, their signs and symptoms seem to worsen, and their fatality charge increases. A preceding have a look at amassed and analysed COVID-19 instances from 575 hospitals in 31 Chinese provincial administrative districts in 2007. 18 of the sufferers had a records of most cancers, indicating that this institution has a better most cancers charge than the overall Chinese population (0.nine percentage vs. 0.29 percentage.[5]

Inaccessible sufferers had a worse risk of survival, extra remedy problems, and extra healthcare expenses. Early detection improves most cancers results through permitting remedy on the earliest viable time, making it a important public fitness method for most cancers sufferers' fitness and health at some stage in their lives, from analysis to death. This consists of the physical, mental, emotional, social, and economic outcomes of most cancers, which start on the time of analysis and retain throughout remedy and beyond. Cancer sufferers should be dealt with in a dynamic way this is tailor-made to their precise needs. Oncology should bear in mind that if the Covid-19 epidemic is avoided, the danger of high-stage oncology care being unavailable is extra than the danger of a SARS-COV-2 contamination in a most cancers patient. In addition to assaulting the respiration machine and developing havoc with inside the lungs, Covid-19 can result in circulate problems and cardiac infarction. Understanding the procedures that make a contribution to cardiac troubles throughout covid-19 contamination ought to cause the improvement of extra targeted and tailor-made healing alternatives for at-danger individuals, which include most cancers sufferers and survivors, and thereby enhance results.

Providing therapy to immune-compromised individuals and cancer patients in the midst of the epidemic has been extremely difficult. According to Chinese research, most cancers sufferers inflamed with COVID-19 have a 3.5-fold better probability than the overall populace of requiring mechanical respiration or ICU admission. Furthermore, a loss of assets in outpatient settings, including administrative personnel and specialists, has hampered habitual take care of those sufferers. Eight several courses exploring the pathogenesis and remedy of COVID-19 were posted because the virus's viral spread, however little is understood approximately the danger factors, prognosis, and remedy results in most cancers sufferers. Based on the existing literature, we review the likelihood of COVID-19 infections in cancer patients, as well as the public health implications, research implications, and therapy outcomes. The challenges of treating COVID-19-positive cancer patients in the clinic are described.

## OBJECTIVE

- To assess physiological impact and prognosis of COVID-19 infections in cancer patients.
- To assess facilitate improvement in the clinical management of these cancer patients.

## METHODOLOGY:

I have worked on literature review of articles of Primary data on Impact of COVID-19 on Cancer Prevalence from sources like PubMed, Google scholar, Scopus, and Research gate. Based on the literature review, I have provided recommendations to overcome the impact of COVID-19 on cancer. The studies that I has include are articles from all over the world so that we can have a better understanding of the impact.

- Selection Criteria – Full article on effect of covid-19 on cancer. Articles published from 2019 to 2021 term are included in the study.
- Keywords – covid-19 and cancer, pandemic and cancer, coronavirus and cancer
- Search Engine – Google scholar, PubMed, and Research gate.
- Study Design – Descriptive study
- Number of studies reviewed- 124 out of which 50 studies were selected

## REVIEW OF LITERATURE

| SR. NO. | Tittle | Source ( From where, If report- link) | Published On | Place of publication (Country, specific area) | Objective (Reason/ why is that done) | Study Design(Nat/Internat, Pri-observation,Intervention,Sec-sources/how) |
|---|---|---|---|---|---|---|
| 1 | COVID-19 dashboard | COVID-19 dashboard. https://coronavirus.jhu.edu/map.html. (accessed on 19 September 2021) | 2021 | Global | COVID-19 dashboard | REPORT |
| 2 | Characteristics and outcomes of patients with breast cancer diagnosed with SARS-Cov-2 infection at an academic | Kalinsky K., Accordino M.K., Hosi K. Characteristics and outcomes of patients with breast cancer diagnosed with SARS-Cov-2 infection at an academic center in New York City. *Breast Cancer Res Treat.* 2020;182(1):239–242. doi: 10.1007/s10549-020-05667-6. | 14-05-2020 | New York City,USA | Focused on those with symptoms from COVID-19 requiring hospitalization, with lung cancer being the most frequent malignancy. | SECONDARY REVIEW |

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|---|---|---|---|---|---|---|
| 3 | COVID-19 in persons with haematological cancers. | He W., Chen L., Chen L. COVID-19 in persons with haematological cancers. *Leukemia.* 2020;34(6):1637–1645. doi: 10.1038/s41375-020-0836-7. | 24-04-2020 | Wuhan,China | Hospitalised persons with haematological cancers at great risk to develop COVID-19 cannot be accurately prospectively identified. As such, these persons should receive heighten surveillance and protective isolation should be considered. | COHORT STUDY |
| 4 | Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study | Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, Qiu Y, Wang J, Liu Y, Wei Y, Xia J', Yu T, Zhang X, Zhang L. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet.* 2020; 395:507–513. doi: 10.1016/S0140-6736(20)30211-7 | 30-01-2020 | Wuhan,China | Clarify the epidemiological and clinical characteristics of 2019-nCoV pneumonia. | Retrospective cohort |

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|---|---|---|---|---|---|---|
| 5 | Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China | Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020 | 24-05-2020 | Wuhan ,China | A recent cluster of pneumonia cases in Wuhan, China, was caused by a novel betacoronavirus, the 2019 novel coronavirus (2019-nCoV). We report the epidemiological, clinical, laboratory, and radiological characteristics and treatment and clinical outcomes of these patients. | Prospective cohort |

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|---|---|---|---|---|---|---|
| 6 | Coronavirus disease (COVID-19): a primer for emergency physicians. | Chavez S, Long B, Koyfman A, Liang SY. Coronavirus disease (COVID-19): a primer for emergency physicians. Am J Emerg Med. 2020. | 24-03-2020 | worldwide population | This review article provides emergency physicians with an overview of the most current understanding of COVID-19 and recommendations on the evaluation and management of patients with suspected COVID-19. | SECONDARY REVIEW |
| 7 | Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected. WHO 2021 | World Health Organization. (2020). Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected: interim guidance, 13 March 2020. World Health Organization. https://apps.who.int/iris/handle/10665/331446. License: CC BY-NC-SA 3.0 IGO | 13-03-2020 | Global | Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected. WHO 2021 | Report |

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|---|---|---|---|---|---|---|
| 8 | Cancer patients in SARS-CoV-2 infection: a nationwide analysis in China. | Liang W, Guan W, Chen R, Wang W, Li J, Xu K, et al. Cancer patients in SARS-CoV-2 infection: a nationwide analysis in China. *Lancet Oncol.* 2020; 21:335–7. | 14-Feb-20 | Wuhan,China | Patients with cancer are more susceptible to infection than individuals without cancer because of their systemic immunosuppressive state caused by the malignancy and anticancer treatments | COHORT STUDY |
| 9 | Nosocomial infections in patients with cancer. | Kamboj M, Sepkowitz KA. Nosocomial infections in patients with cancer. Lancet Oncol. 2009; 10:589–97. | 9-Jun | Global | We outline current knowledge of the incidence and microbiology of various nosocomial infections in patients with cancer-a large, immunosuppressed population. | SECONDARY REVIEW |

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|---|---|---|---|---|---|---|
| 10 | Selective depletion of regulatory T cell subsets by docetaxel treatment in patients with nonsmall cell lung cancer | Li J-Y, Duan X-F, Wang L-P, Xu Y-J, Huang L, Zhang T-F, et al. Selective depletion of regulatory T cell subsets by docetaxel treatment in patients with nonsmall cell lung cancer. J Immunol Res. 2014; 2014:286170 | 28-06-2014 | Zhengzhou,China | This study revealed dynamic changes of various Treg cell subsets in NSCLC patients before and after chemotherapy, providing activated Treg cells as a potential target for chemotherapy. | COHORT STUDY |
| 11 | Features of postoperative immune suppression are reversible with interferon gamma and independent of interleukin-6 pathways | Longbottom ER, Torrance HDT, Owen HC, Fragkou PC, Hinds CJ, Pearse RM, et al. Features of postoperative immune suppression are reversible with interferon gamma and independent of interleukin-6 pathways. Ann Surg. 2016; 264:370–7. | 14-08-2016 | London | this study was to evaluate the role of interleukin (IL)-6 pathways in postoperative immune suppression and to assess the reversibility of this phenomenon. | clinical trial |

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|---|---|---|---|---|---|---|
| 12 | Myeloid suppressor cells in cancer and autoimmunity. | Sica A, Massarotti M. Myeloid suppressor cells in cancer and autoimmunity. J Autoimmun. 2017; 85:117–25. | | | Tumor-associated myeloid cells comprise heterogeneous populations acting systemically (myeloid-derived suppressor cells/MDSCs) and/or locally in the tumor microenvironment (MDSCs and tumor-associated macrophages/TAMs). | |

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|---|---|---|---|---|---|---|
| 13 | Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in china: summary of a report of 72314 cases from the Chinese center for disease control and preventi on. | Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in china: summary of a report of 72314 cases from the Chinese center for disease control and prevention. *JAMA.* 2020; 323:1239–42 | 12/4/ 2020 | china | Summary of a Report of 72 314 Cases From the Chinese Center for Disease Control and Prevention | CASE CONTROL |

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|---|---|---|---|---|---|---|
| 14 | Impact of covid -19 in cancer patients on severity of disease and fatal outcomes: A systematic review and meta-analysis. Diabetes & Metabolic Syndrome: Clinical Research & Reviews. | Salunke AA et al. Impact of covid -19 in cancer patients on severity of disease and fatal outcomes: A systematic review and meta-analysis. Diabetes & Metabolic Syndrome: Clinical Research & Reviews. 2020;14(5):1431–7. | 20-Sep | Global | Impact of cancer on serious events including ICU admission rate and mortality in COVID 19. | SYSTEMATIC REVIEW |
| 15 | Cancer patients in SARS-CoV-2 infection: a nationwide analysis in China. | Liang W et al. Cancer patients in SARS-CoV-2 infection: a nationwide analysis in China. *Lancet Oncol.* 2020; 21:335–7. | 14-Feb-20 | Wuhan,China | Patients with cancer are more susceptible to infection than individuals without cancer because of their systemic immunosuppressive state caused by the malignancy and anticancer treatments | COHORT STUDY |

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|---|---|---|---|---|---|---|
| 16 | Chemotherapy and COVID-19 Outcomes in Patients with Cancer. | Jee J, Foote MB, Lumish M, et al. Chemotherapy and COVID-19 Outcomes in Patients with Cancer. J Clin Oncol. 2020;14 | 2020 | USA | Coronavirus-2019 (COVID-19) mortality is higher in patients with cancer than in the general population | OBSERATIONAL STUDY |
| 17 | COVID-19 mortality in patients with cancer on chemotherapy or other anticancer treatments: a prospective cohort study. | Lee LYW, Cazier JB, Starkey T, Turnbull CD, Kerr R, Middleton G. COVID-19 mortality in patients with cancer on chemotherapy or other anticancer treatments: a prospective cohort study. Lancet. 2020; 28:28. | 20-May | UK | to describe the clinical and demographic characteristics and COVID-19 outcomes in patients with cancer | prospective cohort study |
| 18 | Clinical impact of COVID-19 on patients with cancer (CCC19): a cohort study. | Kuderer NM, Choueiri TK, Shah DP, et al. Clinical impact of COVID-19 on patients with cancer (CCC19): a cohort study. Lancet. 2020;395(10241):1907-1918 | 28-05-2020 | USA, Canada, and Spain | cancer and COVID-19 and identify potential prognostic factors for mortality and severe illness. | COHORT STUDY |

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|---|---|---|---|---|---|---|
| 19 | COVID-19 in patients with thoracic malignancies (TERAVOLT): first results of an international, registry-based, cohort study. | Garassino MC, Whisenant JG, Huang LC, et al. COVID-19 in patients with thoracic malignancies (TERAVOLT): first results of an international, registry-based, cohort study. Lancet Oncol. 2020;21(7):914-922 | 12/6/2020 | GLOBAL | to study the effect of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection on patients with thoracic malignancies. | nternational, registry-based observational study composed of a cross-sectional component and a longitudinal cohort component |
| 20 | Determinants of COVID19 disease severity in patients with cancer. | Robilotti EV, Babady NE, Mead PA, et al. Determinants of COVID19 disease severity in patients with cancer. Nat Med. 2020; 24:24 | 20-Aug | New York City,USA | we report on the epidemiology of COVID-19 illness experienced at our tertiary-care cancer center during the height of incident cases in New York City, and offer an analysis of risk factors for severe infection that is pertinent to cancer patient populations. | SECONDARY REVIEW |

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|---|---|---|---|---|---|---|
| 21 | factors associated with COVID-19 death in 17 million patients. | Williamson EJ, Walker AJ, Bhaskaran K, et al. OpenSAFELY: factors associated with COVID-19 death in 17 million patients. Nature. 2020; 8:8. | 20-Apr | LONDON | clinical factors associated with COVID-19-related death | ANALYTICAL STUDY |
| 22 | Patients with cancer appear more vulnerable to SARS-COV-2: a multicenter study during the COVID-19 outbreak | Dai M et al. Patients with cancer appear more vulnerable to SARS-COV-2: a multicenter study during the COVID-19 outbreak. *Cancer Discov.* 2020; 10:783–91. | 20-Jun | CHINA | Patients who received surgery had higher risks of having severe events, whereas patients who underwent only radiotherapy did not demonstrate significant differences in severe events when compared with patients without cancer | A Multicenter Study |

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|---|---|---|---|---|---|---|
| 23 | Clinical characteristics of COVID-19-infected cancer patients: a retrospective case study in three hospitals within Wuhan, China. | Zhang L, Zhu F, Xie L, Wang C, Wang J, Chen R, et al. Clinical characteristics of COVID-19-infected cancer patients: a retrospective case study in three hospitals within Wuhan, China. Ann Oncol. 2020; 31:894–901 | 20-Jul | Wuhan,China | Cancer patients are regarded as a highly vulnerable group in the current Coronavirus Disease 2019 (COVID-19) pandemic | retrospective case study |
| 24 | The impact of the COVID-19 pandemic on cancer deaths due to delays in diagnosis in England, UK: a national, population-based, modelling study | Maringe, C., Spicer, J., Morris, M., Purushotham, A., Nolte, E., Sullivan, R., Rachet, B., & Aggarwal, A. (2020). The impact of the COVID-19 pandemic on cancer deaths due to delays in diagnosis in England, UK: a national, population-based, modelling study. The Lancet. Oncology, 21(8), 1023–1034. https://doi.org/10.1016/S1470-2045(20)30388-0 | 21-08-2021 | England, Uk | To assess the Impact of delays in diagnosis on cancer survival outcomes in four major tumour types. | population-based, modelling study |

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|---|---|---|---|---|---|---|
| 25 | The Impact of the COVID-19 Pandemic on Cancer Patients | Al-Quteimat, O. M., & Amer, A. M. (2020). The Impact of the COVID-19 Pandemic on Cancer Patients. American journal of clinical oncology, 43(6), 452–455. https://doi.org/10.1097/COC.0000000000000712 | 23-04-2020 | Global | . to focus on the impact of COVID-19 on a cancer patient and discuss management options and recommendation in addition to highlighting the currently available clinical guidelines and resources | SECONDARY REVIEW |
| 26 | Impact of the COVID-19 Pandemic on Cancer Care: A Global Collaborative Study. | Jazieh, A. R., Akbulut, H., Curigliano, G., Rogado, A., Alsharm, A. A., Razis, E. D., Mula-Hussain, L., Errihani, H., Khattak, A., De Guzman, R. B., Mathias, C., Alkaiyat, M., Jradi, H., Rolfo, C., & International Research Network on COVID-19 Impact on Cancer Care (2020). Impact of the COVID-19 Pandemic on Cancer Care: A Global Collaborative Study. JCO global oncology, 6, 1428–1438. https://doi.org/10.1200/GO.20.00351 | 21-Sep | Global | to evaluate the impact of this pandemic on cancer care worldwide | Collaborative Study |
| 27 | Impact of COVID-19 on cancer care in India: a cohort study. | Ranganathan P, Sengar M, Chinnaswamy G, Agrawal G, Arumugham R, Bhatt R, et al. Impact of COVID-19 on cancer care in India: a cohort study. Lancet Oncol. 2021;22(7):970–6. | 21-07-2021 | India | To assess the impact of the COVID-19 pandemic on cancer care in India. | cohort study |

| | | | | | | |
|---|---|---|---|---|---|---|
| 28 | Changes in the Number of US Patients with Newly Identified Cancer Before and During the Coronavirus Disease 2019 (COVID-19) Pandemic | Kaufman HW, Chen Z, Niles J, Fesko Y. Changes in the Number of US Patients with Newly Identified Cancer Before and During the Coronavirus Disease 2019 (COVID-19) Pandemic. JAMA Netw Open. 2020;3(8): e2017267. | 3/8/2020 | USA | examines changes in the number of patients with newly identified cancer before and during the coronavirus disease 2019 (COVID-19) pandemic in the United States | OBSERATIONAL STUDY |

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| 29 | Association of Cancer Screening Deficit in the United States With the COVID-19 Pandemic. | Chen RC, Haynes K, Du S, Barron J, Katz AJ. Association of Cancer Screening Deficit in the United States With the COVID-19 Pandemic. *JAMA Oncol.* 2021;7(6):878–884. doi:10.1001/jamaoncol.2021.0884 | 21-Jun | USA | To quantify the screening rates for breast, colorectal, and prostate cancers associated with the COVID-19 pandemic in different geographic regions and for individuals in different SES index quartiles and estimate the overall cancer screening deficit in 2020 across the US population. | etrospective cohort study |

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| 30 | Impact of COVID-19 on Cancer Care: How the Pandemic Is Delaying Cancer Diagnosis and Treatment for American Seniors | Patt, D., Gordan, L., Diaz, M., Okon, T., Grady, L., Harmison, M., Markward, N., Sullivan, M., Peng, J., & Zhou, A. (2020). Impact of COVID-19 on Cancer Care: How the Pandemic Is Delaying Cancer Diagnosis and Treatment for American Seniors. JCO clinical cancer informatics, 4, 1059–1071. https://doi.org/10.1200/CCI.20.00134 | 20-Sep | USA | cancer screenings and treatment is not yet well understood or well documented throughout the country comprehensively | OBSERATIONAL STUDY |
| 31 | A guide to cancer care delivery during the COVID-19 pandemic, 2020. | American Society of Clinical Oncology: ASCO special report: A guide to cancer care delivery during the COVID-19 pandemic, 2020. | 20-Jun | USA | A guide to cancer care delivery during the COVID-19 pandemic, 2020. | Report |
| 32 | The official French guidelines to protect patients with cancer against SARS-CoV-2 infection | You B, Ravaud A, Canivet A, et al: The official French guidelines to protect patients with cancer against SARS-CoV-2 infection. Lancet Oncol 21:619-621, 2020 | 20-May | FRANCE | to protect patients withZ cancer against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, while maintaining the possibility of cancer treatment. | Review paper |

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| 33 | Guidelines to reduce hospitalization rates for patients receiving curative-intent radiation therapy during the COVID-19 pandemic: Report from a multicenter New York area institution. | Chen WC, Teckie S, Somerstein G, et al: Guidelines to reduce hospitalization rates for patients receiving curative-intent radiation therapy during the COVID-19 pandemic: Report from a multicenter New York area institution. Adv Radiat Oncol 5:621-627, 2020 | 20-May | USA | . Patients with tumors of the aerodigestive tract and pelvis, among others, often experience toxicity during treatment, and there is a baseline risk that adverse effects may require hospital-based management | MULTICENTRE REPORT |
| 34 | COVID-19, and the precautionary principle: Prioritizing treatment during a global pandemic. | Hanna TP, Evans GA, Booth CM: Cancer, COVID-19, and the precautionary principle: Prioritizing treatment during a global pandemic. Nat Rev Clin Oncol 17:268-270, 2020 | 12/4/2020 | GLOBAL | a general framework for prioritizing cancer care, emphasizing the precautionary principle in decision making | SECONDARY REVIEW |

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| 35 | Clinical guide for the management of noncoronavirus patients requiring acute treatment: cancer | Specialty Guides for Patient Management during the Coronavirus Pandemic: Clinical guide for the management of non-coronavirus patients requiring acute treatment: Cancer. | 2020 | Global | To evaluate time to colonoscopy after a positive FIT result and its association with risk of colorectal cancer and advanced-stage disease at diagnosis | Report |

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| 36 | Pharmacy and Therapeutics Committee Preparedness Plan for COVID-19. | Carolina, Laila & Abu Esba, Laila & Al-Abdulkarim, Hana & Alrushidan, Ahmed & Harbi, Mohammed. (2020). Pharmacy and Therapeutics Committee Preparedness Plan for COVID-19. 10.4103/JQSH-20-9. | 20-May | riyad,saudi arabia | to select the most appropriate therapies despite the limited evidence, and make appropriate decisions related to which drugs to procure and stock. Potential therapies and recommendations to the P&T committee at a large healthcare institution as means of a preparedness plan are reviewed here. | Review paper |

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| 37 | Availability of medicines during COVID-19 pandemic | European Medicines Agency: Availability of medicines during COVID-19 pandemic, 2020 | 5-Jul | EU | The European Medicines Agency (EMA) and its partners in the European medicines regulatory network have put measures in place to help prevent and mitigate possible disruptions to the supply of medicines in the European Union (EU) during the COVID-19 pandemic. Extraordinarily, EMA is acting as central coordinator in supporting Member States' activities in this area during the pandemic. | Report |

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| 38 | Association between time to colonoscopy after a positive fecal test result and risk of colorectal cancer and cancer stage at diagnosis. | Corley DA, Jensen CD, Quinn VP, Doubeni CA, Zauber AG, Lee JK, et al. Association between time to colonoscopy after a positive fecal test result and risk of colorectal cancer and cancer stage at diagnosis. JAMA. 2017;317(16):1631. | 25-04-2017 | califormia | To evaluate time to colonoscopy after a positive FIT result and its association with risk of colorectal cancer and advanced-stage disease at diagnosis. | cohort study |

## Risk of Covid-19 Infection in Cancer Patients

Cancer sufferers have appeared to be specifically inclined populace with regards to COVID-19 transmission due to the fact their immunity is compromised because of tumour increase and anti-neoplastic therapy. According to a cohort take a look at related to Cancer Consortium and COVID-19 (CCC19) wonderful most cancers sufferers from the United States, Canada, and Spain, the maximum not unusual place most cancers histological kinds have been Breast Cancer (21 percent) and Prostate Cancer (eleven percent) (sixteen percent).[6,7,8,9] Furthermore, since SARS-CoV-2 has been shown to be spread to patients via a nosocomial route, cancer patients in healthcare environments are at a significantly higher risk.

It was detected in an Indian study of 3775 COVID-19 patients, of whom 63 (1.7%) had cancer. ICU admission was 40 percent in COVID-19-infected cancer patients and 8.4 percent in non-cancer patients, according to a pooled estimate. Similarly, death rates were expected to be 20.8 percent and 78 percent in COVID -19 patients with and without cancer, respectively.[10] COVID-19-inflamed most cancers sufferers are much more likely to require ICU admissions and feature a better danger of death, in keeping with the findings of this study.

In a Chinese countrywide cohort study, Liang et al. discovered that most cancers patients, similarly to the chance of Covid-19 infection, had a better chance of intense scientific events (ICU hospitalizations, invasive ventilation, or mortality) than the ones without most cancers. SARS-CoV-2 inflamed most cancers patients (39%) had intense signs in comparison to COVID-19 folks who did now no longer have most cancers (eight percent). Males, advanced age (over 60 years), smoking, obesity, hypertension, and cardiovascular disease have all been linked to an increased risk of serious illness and/or mortality.[11,12,13,14,15,16]

## High Risk Cancer Stage and Histology type in COVID-19 patients

Researchers examined 536 most cancers sufferers and 536 age-matched non-most cancers sufferers for SARS-CoV-2 contamination all through the COVID-19 outbreak in China in 2020, and discovered that the frequency of lung most cancers histology turned into maximum in virus inflamed sufferers (20.ninety five percent), accompanied with the aid of using gastrointestinal most cancers (12.38 percent), breast most cancers (10.forty eight percent), thyrotoxicosis (10.forty eight percent), and hematologic most cancers (10.forty eight percent) (8.fifty seven percent). COVID-19 inflamed most cancers sufferers had a more demise rate, ICU admission rate, and severity of signs than COVID-19 inflamed most cancers sufferers who did now no longer have most cancers, consistent with this study.[17] This study suggests that patients with lung cancer should be prioritised during this pandemic to reduce cancer-related morbidity and mortality.

Another retrospective cohort take a look at from Wuhan, China, discovered that COVID-19 contamination changed into extra typical in most cancers sufferers at Stage IV sickness progression, primarily based totally on scientific statistics accumulated from 28 COVID-nine inflamed most cancers sufferers in 3 hospitals among the dates of thirteen January and 26 February (35.7 percent). Furthermore, patients with COVID-19 infection had a greater rate of lung cancer. COVID-19 prevalence is higher in later stages of cancer, according to the findings. COVID-19 may be a risk factor for Lung Cancer patients based on the findings of bot investigations.

## Impact of Covid-19 on Public Health across the Cancer continuum

Aside from the disease itself, the COVID-19 outbreak has had a variety of consequences. Reduced access to healthcare for other diseases is one of these consequences. During the early stages of the pandemic, it became clear that public health resources should be directed toward resolving COVID-19 symptoms, which are growing more common in people, and preventing infection in people who have not been exposed to the virus. Due to this diversion of health resources, there has been a delay in cancer screening, diagnosis, and treatment, which will almost certainly result in a reduction in the number of cancer diagnoses in the short term, but will eventually lead to increased cancer diagnosis at later stages and preventable cancer-related deaths.

According to a review research, cancer patients had a 3.5-fold increased likelihood of needing assisted respiration, being admitted to the ICU, or dying. Patients with cancer have a 3.5-fold increased likelihood of needing artificial respiration, ICU admission, or dying than those without cancer. Cancer patients may be more vulnerable to significant COVID-19 difficulties because to immunosuppression caused by the disease, as well as anticancer treatments like chemotherapy or surgery. Patients who received chemotherapy or surgery within 30 days of their COVID-19 presentation had a higher risk of serious events than those who did not. A family history of cancer was also linked to a higher likelihood of significant effects and lower COVID-19 scores. Lung cancer patients did not have a higher incidence of significant side effects when compared to those with other cancer types.[18]

Data was collected on 32 583 breast cancer patients, 24 975 colorectal cancer patients, 6744 oesophageal cancer patients, and 29 305 lung cancer patients in a study done in the United Kingdom. In the first five years after diagnosis, the number of fatalities due to breast cancer climbed by 79 percent to 96 percent. Colorectal cancer fatalities increased by 53 percent to 66 percent, lung cancer deaths increased by 48 percent to 53 percent, and oesophageal cancer deaths increased by 58 percent to -60 percent. There's a good probability it'll happen. The COVID-19 outbreak in the UK is predicted to result in a considerable rise in the number of cancer deaths that could have been avoided.[19]

According to a cross-sectional have a look at of 356 centres from fifty four countries, 88.2 percentage of centres struggled to offer care in the course of the pandemic, 55.34 percentage reduce offerings as a precaution, and different not unusual place motives protected an overburdened system (19.ninety four percentage), an absence of private shielding equipment (19.10 percentage), a workforce shortage (17.ninety eight percentage), and restrained get right of entry to medications (17.ninety eight percentage). (9.873%) According to 46.31 percentage of the centres, extra than 10% of sufferers skipped at the least one remedy cycle. According to participants, patients were hurt by the discontinuation of cancer-specific care (36.52 percent) and no cancer-related care (39.04 percent), with some centres believing that up to 80% of their patients were impacted. According to the data, the COVID-19 pandemic has had a substantial influence on cancer care with varying degrees of severity among canters globally.[20]

Radiation and palliative remedy skilled considerably lesser discounts in a state-huge cohort study (retrospective, prospective) in India, undertaken at forty one most cancers centres (individuals of the National Cancer Grid of India). Reductions have been best from April to May 2020, while the USA turned into below lockdown. The USA lockdown started out on March 24, 2020, and the decrease wide variety of sufferers in that month turned into probable because of infection-associated phobia, however discounts in April and May have been now no longer most effective because of infection-associated phobia however additionally to lockdown-associated logistical restrictions. It turned into additionally highlighted that most important most cancers centres in city towns noticed a extra decline than smaller locations throughout the USA.

**Comparison of the supply of hospital oncology services across all participating centres between March 1 to May 31, 2019 and March 1 to May 31, 2020.**

In evaluation to the equal duration in 2019, there has been a good sized decline in affected person counts throughout all most cancers offerings among March 1 and May 31, 2020. The range of latest affected person registrations fell from 112 270 to fifty one 760, the sharpest discount with inside the industry (fifty four percent). Patients who obtained radiation and palliative care declined at a slower charge than people who obtained different offerings. When in comparison to the equal duration ultimate year, the general discount in affected person numbers throughout all oncology offerings became even greater extreme from April to May 2020, considerably for brand spanking new affected person registrations, general outpatient visits, and procedures, which all plummeted through greater than 60%.[21]

**Percentage reductions by city classification in provision of hospital oncology services between 2019 and 2020.**

Tier 1 towns suggested a larger drop with inside the variety of sufferers in search of oncology offerings than tier three towns among April 1 and May 31, 2020, with 50–seventy five percentage discounts in almost all most cancers Center offerings in tier 1 towns. Between April 1 and May 31, 2020, affected person numbers reduced greater than they did among March 1 and May 31, 2019. When in comparison to the identical length in 2019, public and nonprofit hospitals noticed large affected person losses than personal hospitals among March and May 2020. There had been no important variations in affected person counts among oncology-particular centers and multispecialty hospitals.

## Cancer Screening and Detection

Other organisations, like because the American Cancer Society, advised behind schedule recurring most cancers screenings and different non-obligatory scientific approaches whilst the COVID-19 pandemic to start with broke out, that allows you to attention on pressing scientific wishes and restriction the unfold of COVID-19. This advice, coupled with the fear of being infected with the virus in the medical setting, has led to a significant reduction in screening.. When as compared to the identical term in 2019, one digital scientific file enterprise stated an predicted malignancies inside their affected person institution in March and April of 2020. Screening for those malignancies had expanded via way of means of June 2020, even though it changed into nonetheless down 29% to 36% from pre-pandemic levels. [22,23,24] Due to delays in cancer screening and treatment, over 10,000 more breast and colorectal cancer deaths are expected over the next decade.[25]

New most cancers diagnoses in 2020 will possibly be decrease than anticipated because of decrease most cancers screening and different preventive care visits at some point of the COVID-19 pandemic. According to a cross-sectional evaluation of people from the US who underwent checking out from Quest Diagnostics for any cause among March 1 and April 18, 2020, in comparison to January 1 to April 18, 2019, there has been a forty six percentage discount in analysis of six not unusual place malignancies (breast, colorectal, lung, pancreas, stomach, and oesophageal with inside the United States).[26]

During the height of the pandemic in April, screenings for breast, colon, prostate, and lung most cancers had been eighty five percentage, seventy five percentage, seventy four percentage, and fifty six percentage lower, respectively. Hospital outpatient assessment and management (E&M) visits fell with the aid of using seventy four% in April, as did new affected person E&M visits (70%) and modern affected person E&M visits (65%). (Eighty percentage). 70% of the time Approximately 60% of the time The pinnacle physician-administered most cancers merchandise exhibited a decline in billing frequency in April (26%) and July (31%) respectively.[27] Within the US population, the total screening hole associated to the COVID-19 pandemic is estimated to be 3.nine million (breast), 3.eight million (colorectal), and 1.6 million (genital) (prostate).The Northeast noticed the maximum discounts in screening, whilst the West recovered greater slowly than the Midwest and South. To offset COVID-19's disproportionate effect and the pandemic's resulting implications, focused tasks to beautify screening are mainly vital amongst formerly not noted

populations. A tremendous end result need to be accompanied up with a colonoscopy inside 10 months for optimum benefit.[28]

## Cancer Treatment and survivorship

Within the US population, the COVID-19 pandemic's total screening gap was estimated to be 3.nine million (breast), 3.eight million (colorectal), and 1.6 million (genital) (prostate). The Northeast noticed the maximum discounts in screening, whilst the West recovered extra slowly than the Midwest and South. To offset COVID-19's disproportionate effect and the pandemic's resulting implications, focused projects to beautify screening are specifically essential amongst formerly omitted populations. A high quality end result have to be observed up with a colonoscopy inside 10 months for optimum benefit. The maximum usually stated delays had been in-individual doctor appointments (fifty seven percent), imaging services (25 percent), and surgical procedures (15 percent), observed with the aid of using get admission to to supportive services (20 percent), which includes bodily remedy or intellectual fitness care. Nearly 1/2 of of these surveyed (46%) stated they had been in severe economic problems, and 23% stated they had been involved approximately dropping their fitness insurance.

## Impact of Covid-19 on cancer Research

As a result of the COVID-19 pandemic, 60 percent of research groups have delayed screening and/or enrolled in clinical trials. Furthermore, COVID-19 has received a significant amount of research funding, with clinicaltrials.gov reporting approximately 3,370 clinical trials as of September 2020. Patient access and enrolment are likely to increase as a result of recently implemented legislation reforms by US Federal agencies to facilitate decentralised clinical trials. To avoid the spread of SARS-CoV-2 infection, many experiments have been suspended. In addition, the majority of laboratories have changed their policies to limit the number of lab staff that are permitted access. As a result, numerous investigations had been halted. Several personal philanthropic initiatives have additionally didn't steady finances, with the American Cancer Society forecasting a USD two hundred million decline in donations this 12 months and refusing to simply accept studies provide programs for the fall provide season. 356 centres from fifty four nations throughout six continents participated among April 21 and May 8, 2020. Every 12 months, those centre’s see 716,979 new most cancers patients. During the pandemic, the bulk of them (88.2%) claimed it turned into tough to provide care, with 55.34 percentage lowering again on offerings as a precaution. In addition, an crushed system (19.ninety four percentage), an absence of private protecting equipment (19.10 percentage), a employees shortage (17.ninety eight percentage), and restricted get entry to to remedy have been all not unusual place factors (17.ninety eight percentage). (17.ninety eight %) percentage (9.83%) More than ten canters have been discovered in 46.31 percentage of the canters. Nearly 60% of clinical investigators indicated their institutions had stopped screening and/or enrolling in particular trials, and around half said their institutions had stopped collecting blood and other tissue for research reasons, according to a March poll of dozens of clinical investigators.[29]

## Recommendations

Taking preventative measures is recommended in several published guidelines and ideas for dealing with cancer patients during this outbreak.[30,31,32,33,34] Many of the author's recommendations are based on reports from oncologists at the forefront of the current pandemic and reports from people who have experienced outbreaks of infectious diseases such as Middle East Respiratory Syndrome and Severe Acute Respiratory Syndrome. .. Paddy field. Many unknown factors regarding the epidemic, including how it affects a specific country or institution, the intrinsic heterogeneity of cancer patients and the healthcare system, and the influence of these decisions on patient treatment. Because of the many arbitrary decisions that have been made, results that require more research to create an evidence-based approach for the future. Lack of staff, lack of PPE, and lack of access to medicines are all examples of involuntary reasons for lowering the level of care and consider avoiding or at least mitigating their impact in future crises. Worth to do.

In order to ensure that cancer patients receive timely treatment, organisation executives must manage the drug formulary during a crisis. Pharmacy administration should be used to have a sufficient supply of cancer and non-cancer medications on hand. 28 In the case of a pandemic, the US Food and Medicine Administration, the European Medicines Agency, and the United Nations are all working to solve drug shortages.[35,36]

To mitigate the disproportionate COVID-19 impact and its secondary repercussions, there is a need for screening promotion and focused initiatives among the population with remote access to healthcare. For persons at ordinary risk, in-home stool-based diagnostics for colorectal cancer (CRC) screening are becoming increasingly extensively utilised as a safe and effective alternative to colonoscopy. Positive results must be followed up with colonoscopy within 10 months for maximum benefit.[37]

The accuracy of staging and diagnosis, as well as hospital visits, should not be jeopardised for patients with suspected cancer. Active anti-inflammatories should be stopped in patients with suspected covid, and surgical treatments should be postponed if possible. The differential diagnosis should be as broad as possible, taking into account possible anti-cancer treatment side effects as well as viral causes. Patients should be triaged for cancer therapy to ensure that patients with potentially curable diseases who may benefit from treatment are given first priority. Hospital visits should be kept to a minimum for people who have been diagnosed with cancer. If covid-19 co-infection is identified, patients receiving anti-tumour therapy should be rigorously tested for covid-19 infection and should avoid immunosuppressive medications or have their dosage lowered. Chemotherapy should also be postponed, as should surgical operations. Patients with covid-19 should be examined for admission or discharge, and anti-cancer therapy should be stopped.

## Limitations

One of the study's flaws is records collecting at some point of a pandemic, which has various ranges of severity round the arena and whilst the total photo of pandemic effect continues to be unknown. This studies, on the opposite hand, is crucial as it portrays the cutting-edge degree of most cancers screening, prevention, diagnosis, and remedy on an international scale, and it's going to function a basis for destiny studies into the pandemic's long-time period implications on most cancers remedy and outcomes.

## Conclusion

Covid-19 is a singular chance thing for most cancers sufferers and survivors taking cardio toxic anti-most cancers drugs. Patients and survivors of most cancers have weaker immune systems, rendering them greater vulnerable to the dangerous results of Covid-19 infection. People with cancer are more likely to become unwell as a result of covid-19, and they are more likely to experience significant outcomes including as mortality, ICU admission, and mechanical breathing. Active haematological and lung cancer patients had worse Covid-19 outcomes, whereas thoracic cancer patients had a lower risk of ICU hospitalisation. Age, gender, and comorbidities are among factors that influence cancer patient mortality in Covid-19. Immediate coverage movements are had to mitigate the COVID-19 pandemic's projected unfavourable effect on most cancers outcomes, in particular to minimise system-degree delays in most cancers screening, diagnosis, remedy initiation, and clearance of all backlogs instances brought on through the pandemic.

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